

Air pressure switches DL..ALT

TECHNICAL INFORMATION

- Monitoring of air, flue gas and other non-aggressive gases
- Robust aluminium lower housing section
- High switching point stability
- Fast reaction to pressure changes
- Switching point selection via hand wheel
- Visual status indication as an option



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1 Application



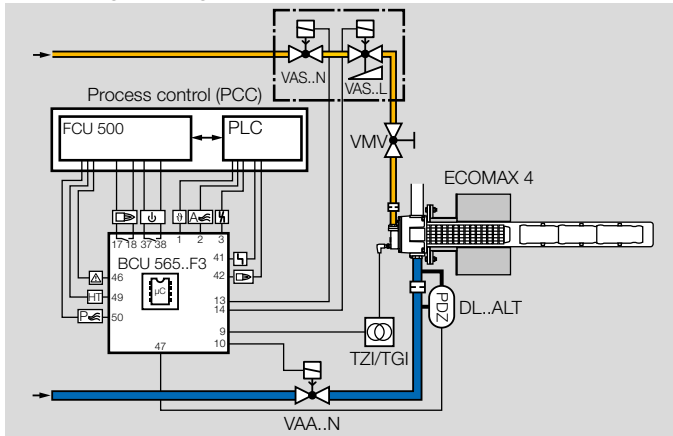
*DL..ALT, UL listed and FM approved:
hand wheel with "WC scale,
1/2" NPT conduit for electrical connection.*

DL..ALT is used for industrial pressure and differential pressure monitoring wherever a robust aluminium housing and fast reaction to pressure changes are required.

It monitors extremely low pressure differentials and triggers switch-on, switch-off or switch-over operations if a set switching point is reached. The switching point can be adjusted using a hand wheel.

1.1 Application examples

1.1.1 Single-stage-controlled burner



Control: ON/OFF.

The gas/air mixture is adjusted to the requirements of the applications using the parameters of pre-ventilation and post-ventilation. The DL..ALT monitors the air flow in the air supply line or in the flue gas exhaust.

2 Certification

Certificates – see www.docuthek.com

FM approved



Factory Mutual Research Class: 3510 Flow and pressure safety switches. Designed for applications pursuant to NFPA 85 and NFPA 86. www.approvalguide.com

UL listed

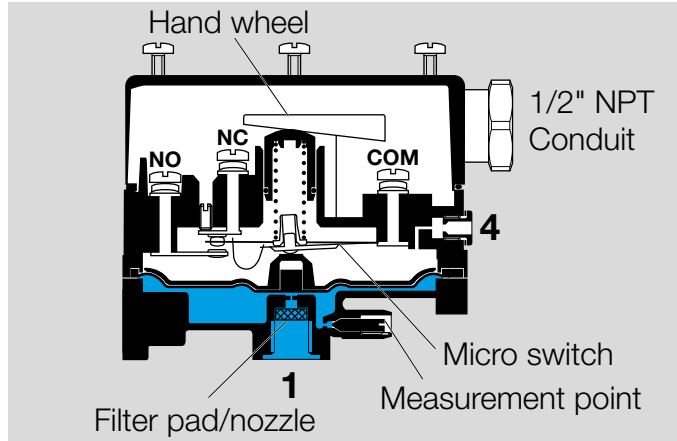
USA and Canada



Underwriters Laboratories – UL 353 “Limit Controls”.
www.ul.com

3 Function

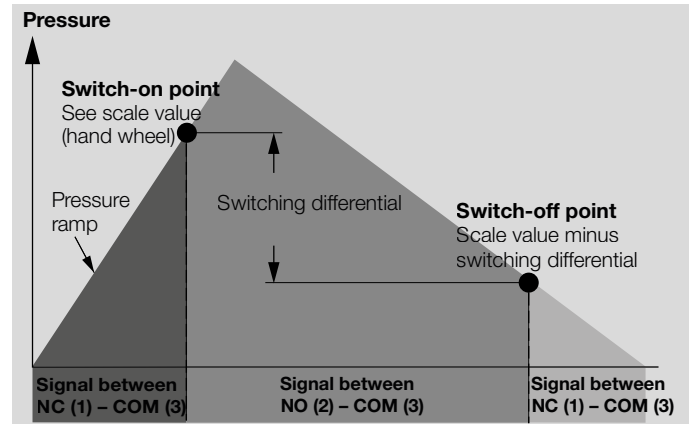
Pressure switch, FM approved and UL listed



The pressure switch DL..ALT switches in the event of rising pressure.

Once the set switching point is reached, a micro switch is activated in the pressure switch which is designed as a change-over contact. The switching pressure is adjusted using a hand wheel.

3.1 Signal curve from NO, NC to COM (pressure switch with change-over contact)



Example

The search is for the possible cut-out point for DL 10ALT.

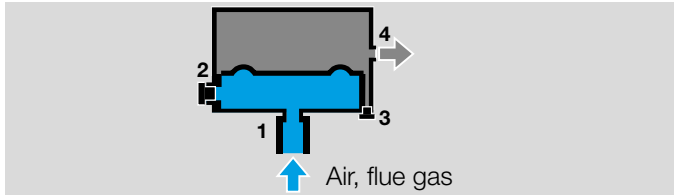
Adjusting ranges and switching differential, see table, page 18 (Adjusting range):

Adjusting range: 0.4 to 4 "WC (1 to 10 mbar),
 mean switching differential at min. and max. setting:
 0.1 to 0.16 "WC (0.25 to 0.4 mbar)

Example: **Hand wheel setting of 4 "WC (10 mbar) minus max. switching point differential of 0.16 "WC (0.4 mbar) delivers a cut-out point = 3.84 "WC (9.6 mbar).**

3.2 Positive pressure measurement

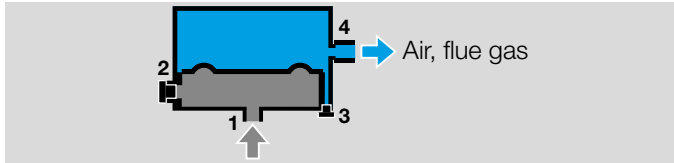
Positive pressure measurement is designed, for example, for checking the fan function or measuring the min./max. pressure.



The positive pressure is measured in the lower diaphragm chamber, port **1** (or **2**). The upper diaphragm chamber is ventilated via port **4** (or **3**).

3.3 Negative pressure measurement

Negative pressure measurement (air, flue gas) is designed, for example, for monitoring a suction pressure blower.

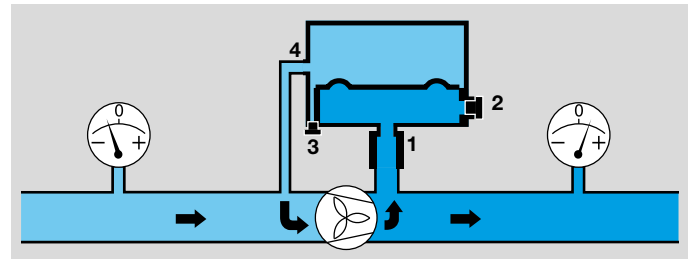
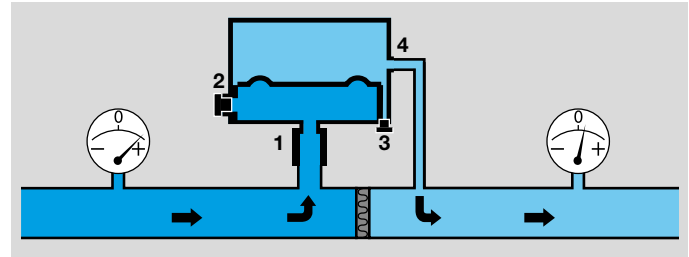


The negative pressure is measured in the upper diaphragm chamber, port **4** (or **3**). The lower diaphragm chamber is ventilated via port **1** (or **2**).

3.4 Differential pressure measurement

Differential pressure measurement is designed for safeguarding an air flow rate or for monitoring filters and fans, for example.

Do not connect port **4** (or **3**) to pipes carrying gas! For further information, see "Project planning information", "Mechanical connection", page 13 (Ports)



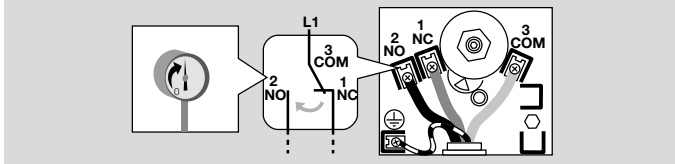
The higher absolute pressure is connected to port **1** (or **2**), and the lower absolute pressure to port **4** (or **3**). The remaining ports must be tightly plugged.

4 Connection diagrams

4.1 Contact position

Contacts 3 and 2 close when subject to increasing pressure.

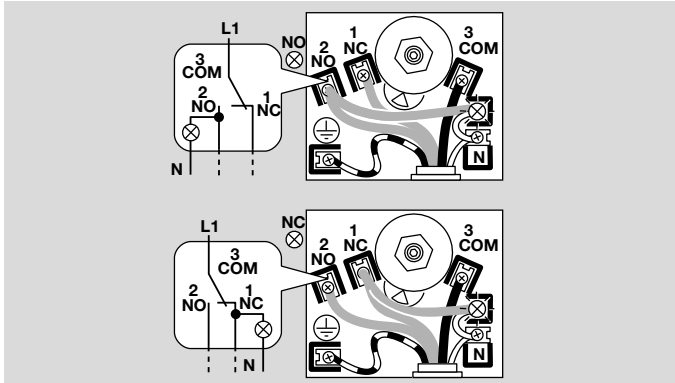
Contacts 1 and 3 close when subject to falling pressure.



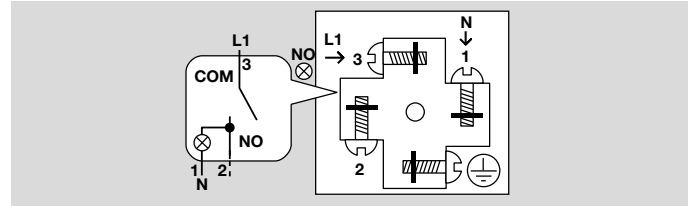
On pressure switches that switch with rising pressure:
The contact switches from NC 1 to NO 2.

On pressure switches that switch with falling pressure:
The contact switches from NO 2 to NC 1.

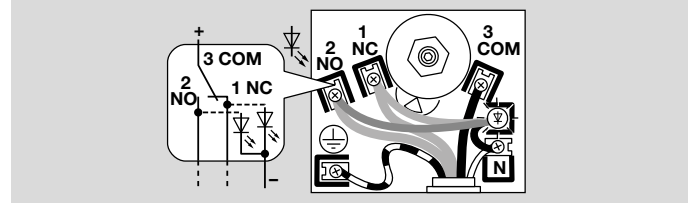
4.2 Blue pilot lamp for 230 V AC or 110/120 V AC



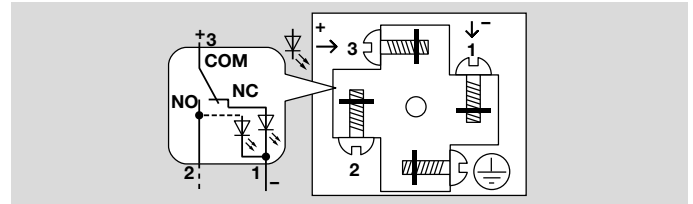
4.3 Pilot lamp with plug



4.4 Red/green pilot LED for 24 V DC/AC or 110–230 V AC



4.5 Pilot LED with plug

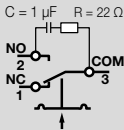


5 Wiring

If the DL..ALT..G has switched a voltage $> 24\text{ V}$ ($> 30\text{ V}$) and a current $> 0.1\text{ A}$ at $\cos \varphi = 1$ or $> 0.05\text{ A}$ at $\cos \varphi = 0.6$ once, the gold plating on the contacts will have been burnt through. It can then only be operated at this power rating or higher power rating.

When using silicone tubes, only use silicone tubes which have been sufficiently cured. Vapours containing silicone can adversely affect the functioning of electrical contacts.

In the case of low switching capacities, such as 24 V , 8 mA , for example, we recommend using an RC module ($22\ \Omega$, $1\ \mu\text{F}$) in air containing silicone or oil.



In the case of high humidity or aggressive gas components (H_2S), we recommend using a pressure switch with gold contact due to its higher resistance to corrosion. Closed-circuit current monitoring is recommended under difficult operating conditions.

5.1 DL..ALT in Zone 1 (21) and 2 (22) hazardous areas

Pressure switch DL..ALT can be used in Zone 1 (21) and 2 (22) hazardous areas if an isolating amplifier is installed upstream in the safe area as “Ex-i” apparatus pursuant to EN 60079-11 (VDE 0170-7):2012.

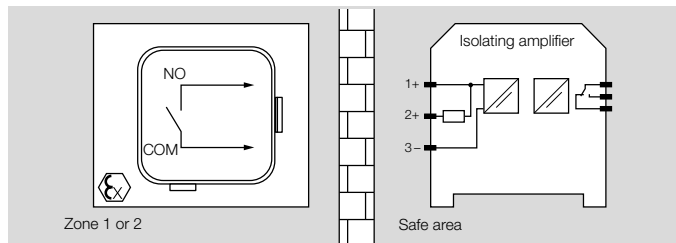
DL..ALT as “simple electrical equipment” pursuant to EN 60079-11:2012 corresponds to the Temperature class T6, Group II. The internal inductance/capacitance is $L_i = 0.2 \mu\text{H}/C_i = 8 \text{ pF}$.

The isolating amplifier transfers the DL..ALT’s signals from the explosion-hazard area to the safe area. Depending on the design of the intrinsically safe circuit, the explosion-hazard area can be monitored for cable faults, cable discontinuities or short-circuits.

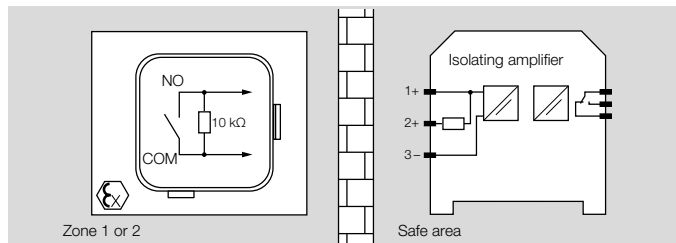
Ensure that standard-compliant wiring pursuant to EN 60079 is used.

When operating in Zones 21 and 22, the 1/8" connecting thread or the tube connection for the surrounding air or medium connection must be protected from dirt particles by a separate filter.

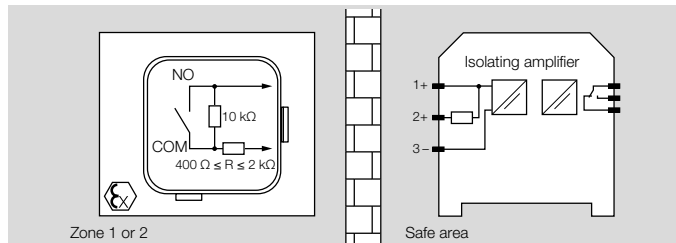
5.1.1 Intrinsically safe circuit without monitoring for cable faults



5.1.2 Intrinsically safe circuit with monitoring for cable discontinuities



5.1.3 Intrinsically safe circuit with monitoring for cable faults and short-circuits



5.2 DL..ALT in Zone 2 (22) hazardous areas

Pressure switch DL..ALT can be connected to pipes/rooms in which Zone 2 (22) explosive gases or dust are present without an isolating amplifier.

The connection to Zone 2, Zone 22 must be implemented via one of the two ¼" threads. Even in the unlikely event of a break in the diaphragm, there is no danger of flashback into the system. The pressure compensation holes on the pressure switch (1/4" connections) have a defined ignition protection, in terms of the safety measure for "enclosed break devices for Group IIA gases and vapours", pursuant to IEC/EN 60079-15.

In the case of Zone 22, it must be ensured that dirt particles do not block the pressure supply hole ($\varnothing = 0.8 \text{ mm}$).

6 Selection

6.1 ProFi

A web app selecting the correct product is available at www.adlatus.org.

6.2 Selection table

Option	DL..ALT
Adjusting range [mbar]	6, 10, 50, 150, 500
Aluminium lower housing section with 2 x 1/4 NPT connection (positive pressure) and 1 x 1/8 NPT connection (negative pressure)	AL
UL listed, FM approved	T
With gold-plated contacts	G
Electrical connection	-2, -4, -9
Pilot lamp	K2, T, T2, N
External adjustment	A

Order example

DL 10ALT-2

Adjusting range and switching hysteresis, see page 17 (Technical data).

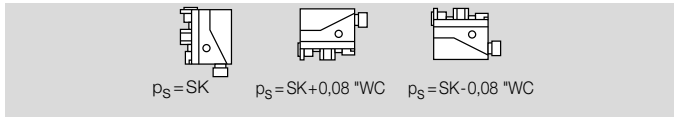
6.3 Type code DL..ALT

DL	Pressure switch for air
6	Adjusting range 0.2–2.4 “WC (0.5-6 mbar)
10	Adjusting range 0.4–4 “WC (1-10 mbar)
50	Adjusting range 1–20 “WC (2.5-50 mbar)
150	Adjusting range 12–60 “WC (30-150 mbar)
500	Adjusting range 40–200 “WC (100-500 mbar)
AL	Aluminium lower housing section, 1/4" NPT connection, hand wheel
T	T-product
G	With gold contacts for voltages < 30 V AC/DC
-2	Electrical connection via screw terminals, 1/2" NPT conduit, NEMA 4 (IP 65)
-4	Electrical connection via screw terminals, cable gland, NEMA 4 (IP 65)
-9	Electrical connection with plug, 4-pin, with socket, NEMA 4 (IP 65)
1	One 1/4" NPT connection
2	Two 1/4" NPT connections
K2	Red/green pilot LED for 24 V DC/AC
T2	Red/green pilot LED for 110 to 230 V AC
N	Blue pilot lamp for 120 V AC
A	External adjustment

7 Project planning information

7.1 Installation position

- » Installation in the vertical or horizontal position, or sometimes upside down, preferably with vertical diaphragm. If installed in a vertical position, the switching point p_S will correspond to the scale value SK set on the hand wheel. If installed in another position, the switching point p_S will change and no longer correspond to the set scale value SK. Switching point p_S must be checked.
- » The set switching point may palpably change in media and ambient temperatures below -22°F (-30°C).



7.2 Installation

The housing must not be in contact with masonry. Minimum clearance 25 mm (1").

Long-term use in the upper ambient temperature range accelerates the ageing of the elastomer materials and reduces the service life (please contact manufacturer).

Continuous operation with gases containing more than 0.1 %-by-vol. H_2S or ozone concentrations exceeding $200 \mu\text{g}/\text{m}^3$ accelerate the ageing of elastomer materials and reduce the service life.

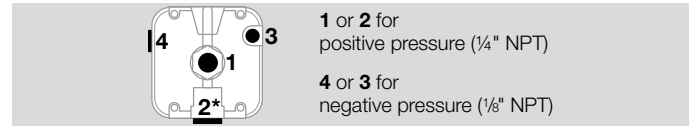
Vapours containing silicone can adversely affect the functioning of electrical contacts. When using silicone tubes, only use silicone tubes which have been sufficiently cured.

Condensation must not be allowed to get into the housing. If possible, install pipework with an ascending gradient. Otherwise, there is a risk of icing of condensation at sub-zero temperatures, the switching point shifting or corrosion in the device which can lead to malfunctions.

When installing outdoors, place the pressure switch in a roofed area and protect from direct sunlight (even IP 65 version).

The weather protection cover provides permanent protection when installed outdoors. See page 16 (Weather protection cover).

7.3 Ports



1 or 2 for positive pressure (1/4" NPT)

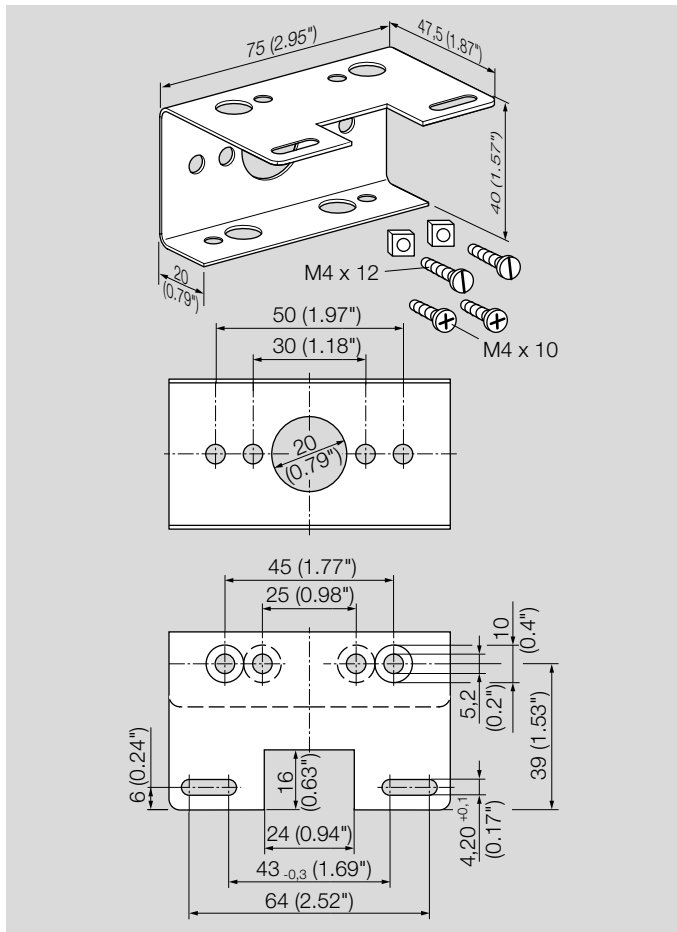
4 or 3 for negative pressure (1/8" NPT)

	Connect	Free
Positive pressure DL...ALT	1 or 2*	4 or 3
Negative pressure DL...ALT	4 or 3	1 or 2*
Differential pressure DL...ALT	1 or 2* for higher absolute pressure. 4 or 3 for lower absolute pressure.	

* Port 2 only on DL...ALT..2 with 2x 1/4" NPT connections.

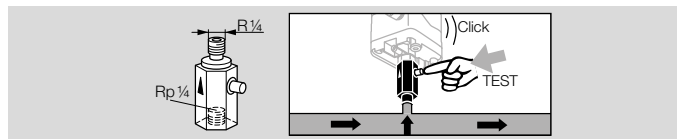
8 Accessories

8.1 Fastening set with screws, U-shape bracket



Order No.: 74915387

8.2 Test key PIA



To test the min. pressure switch, the DL..ALT can be vented in its switched state using the PIA test key (contains non-ferrous metals).

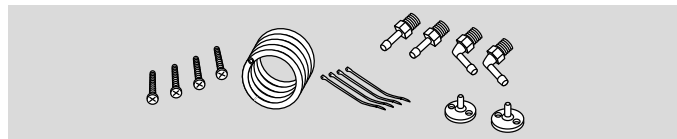
Order No.: 74329466

8.3 Filter pad set

To protect the electrical contacts in the DL..ALT from dirt particles in the surrounding air or in the medium, use a filter pad at the 1/8" negative pressure port. As standard on IP 65 units.

5-piece filter pad set, Order No.: 74916199

8.4 Tube set



To be used with air only.

Tube set with 2 m PVC tube, 2 duct connection flanges with screws, R 1/4 and R 1/8 connecting nipples.

Order No.: 74912952

8.5 Standard coupler plug set



For CE certified pressure switches, Order No.: 74915388

For FM, UL certified pressure switches, Order No.:
75459526

8.6 Pilot lamp set, red or blue



For DL..ALT

Pilot lamp, red:

110/120 V AC, I = 1.2 mA, Order No.: 74920430.

230 V AC, I = 0.6 mA, Order No.: 74920429.

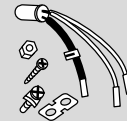
Pilot lamp, blue:

110/120 V AC, I = 1.2 mA, Order No.: 74916121.

230 V AC, I = 0.6 mA, Order No.: 74916122.

8.7 LED set, red/green

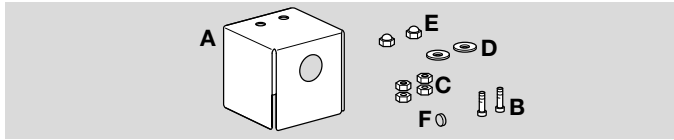
For DL..ALT



24 V DC, I = 16 mA; 24 V AC, I = 8 mA, Order No.:
74921089.

110 to 230 V AC, Order No.: 74923275

8.8 Weather protection cover



When the DG is installed outdoors, the weather protection cover provides permanent protection against condensation and weathering of housing parts.

The weather protection cover is made of 1 mm-thick stainless steel.

The enclosed filter pad is designed to protect the open 1/8" port from the ingress of dirt or insects.

Scope of delivery:

A 2 x covers, 100 x 100 x 100 mm

B 2 x M4 x 16 screws

C 4 x nuts

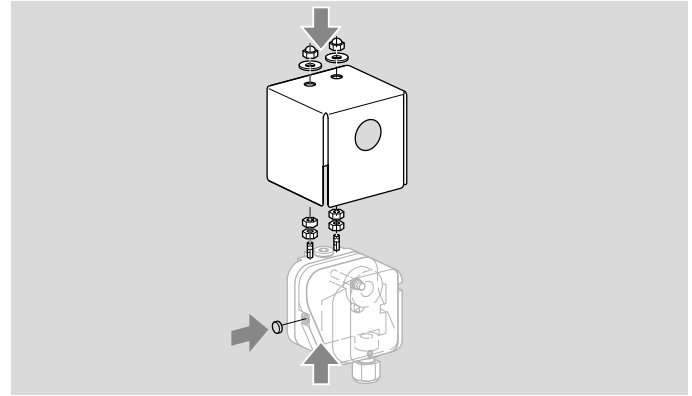
D 2 x washers

E 2 x cap nuts

F 1 x filter pad (1/8" port)

Order No.: 74924909

Installation position: vertical, with the cable gland pointing downwards.



9 Technical data

9.1 Ambient conditions

Maximum medium and ambient temperatures:

-40 to +140°F (-40 to +60°C).

Long-term use in the upper ambient temperature range accelerates the ageing of the elastomer materials and reduces the service life (please contact manufacturer).

Transport temperature: -4 to +176°F (-20 to +80°C).

Storage temperature: -4 to +104°F (-20 to +40°C).

Enclosure: NEMA 4 (IP 65).

This unit is not suitable for cleaning with a high-pressure cleaner and/or cleaning products.

9.2 Mechanical data

Gas types: air or flue gas, no flammable gases, no aggressive gases.

Max. inlet pressure $p_{max.}$ = withstand pressure: 8.5 psi (600 mbar).

Max. test pressure for testing the entire system: temporarily (< 15 minutes) 29 psi (2 bar).

Diaphragm pressure switch, silicone-free.

Diaphragm: NBR.

Housing: glass fibre reinforced PBT plastic with low gas release.

Lower housing section: AISi 12.

Weight: 9.5 to 11.3 oz (270 to 320 g).

9.3 Recommended tightening torque

Component	Tightening torque [Ncm]
Cover screws	65
M16 x 1.5 cable gland	50
½" NPT conduit	170 (15 lb")
Rp 1/8 pipe connection on aluminium lower section	250
Rp 1/4 connection (1/4" NPT) on aluminium lower section	1300
Rp 1/8 connection on upper housing section	250
Clamping terminal screws	80
T15 test point screw	150

9.4 Electrical data

Safety class: 1.

Switching capacity:

	U	cos φ = 1 [A]	cos φ = 0.6 [A]
DL..T	max. 240 V AC	max. 5	max. 0.5
DL..TG*	< 30 V AC/DC	max. 0.1	max. 0.05

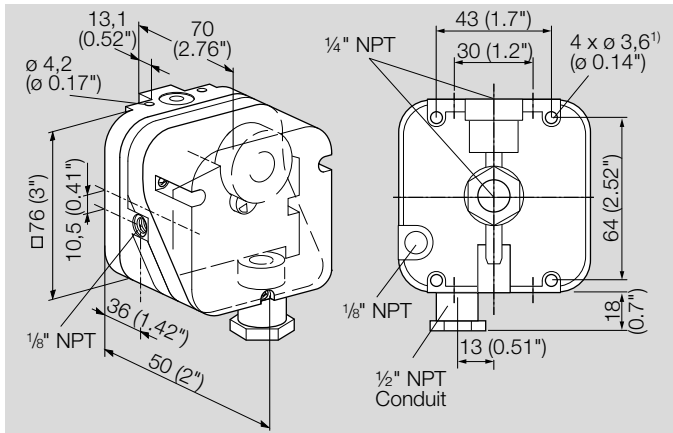
* With gold contacts

Cable diameter: AWG 24 to AWG 13 (0.02 to 0.07" (0.5 to 1.8 mm)).

Line entrance: ½" NPT conduit.

Electrical connection type: screw terminals.

9.5 Dimensions DL..ALT



1) Holes 10 mm (0.4") deep, for self-tapping screws.

9.6 Adjusting range

Type	Adjusting range ¹⁾ "WC (mbar)	Mean switching differential at min. and max. setting ²⁾ "WC (mbar)	Max. inlet pressure p_{\max} , psi (mbar)
DL..6T	0.2–2.4 (0.5–6)	0.08–0.12 (0.2–0.3)	8.5 (600)
DL..10T	0.4–4 (1–10)	0.1–0.16 (0.25–0.4)	8.5 (600)
DL..50T	1–20 (2.5–50)	0.4–0.8 (1–2)	8.5 (600)
DL..150T	12–60 (30–150)	1.2–2 (3–5)	8.5 (600)
DL..500T	40–200 (100–500)	3.2–6.8 (8–17)	8.5 (600)

1) Adjusting tolerance = $\pm 15\%$ of the scale value.

2) Difference between switching pressure and possible reset.

10 Converting units

See www.adlatus.org

11 Maintenance cycles

DL..ALT requires little servicing.

We recommend a function check once a year.

For more information

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschroder and Maxon. To learn more about our products, visit ThermalSolutions.honeywell.com or contact your Honeywell Sales Engineer.

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